



Standards for Supply Chain Documentation

Federal Highway Administration
Office of Freight Management and Operations

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Introduction

The Office of Freight Management and Operations developed a standard approach for documenting supply chains and business processes

- ▶ Objectives were to create a one-stop solution for:
 - Documentation capability that has the breadth of coverage in describing dimensions of supply chains moving into, out of, and within the United States by air, truck, ocean, or rail
 - Analysis capability that facilitates evaluations of the processes, physical flows, information technology, security, and performance of real world supply chains
 - Optional simulation modeling capability to allow for scenario testing and advanced statistical analyses
- ▶ This document describes the standards for documenting the 8 previously defined supply chain dimensions

Standards described in the following section assume that MS Visio 2003 is used as the tool for supply chain documentation

- ▶ Microsoft Visio 2003 Standard (Visio) was chosen as the documentation tool for supply chains and business processes
 - Industry leader for flow charting and best suited for documentation requirements
 - Meets modeling requirements by adding *Process Simulator* plug-in
 - Supports SCOR modeling by customizing graphic palette
- ▶ The FHWA program manager will be responsible for overseeing the creation and editing of supply chain documentation

Three options exist for viewing the documentation developed using MS Visio 2003 Standard

- ▶ To view documentation in Visio (.vsd) format, the user requires either MS Visio 2003 or Visio Viewer 2003
- ▶ Visio Viewer is standard with MS Office Professional and available for download (free of charge) at <http://www.microsoft.com/downloads> , system requirements include:
 - Ability to run ActiveX controls
 - Windows 2000 Service Pack 3, Windows Server 2003, or Windows XP operating system
 - Microsoft Internet Explorer (IE) 5.0 or later
- ▶ We also recommend saving supply chain documentation in .pdf format, to allow stakeholders that do not have access to MS Visio or Visio Viewer to view the files
 - PDF files are viewed using Adobe Acrobat Reader

Documentation Standards

Standard 1: Utilize layers to identify and separate the supply chain dimensions and other information

- ▶ The ability to separate and view specific information about the supply chain enhances documentation usability and analysis capability. Layers provide a helpful way for managing complex diagrams, by:
 - Categorizing objects logically
 - Enabling the user to view and analyze only desired information
 - Protecting object from accidental changes, while enabling easy selection of others
- ▶ Document each dimension of the supply chain on a separate layer (see definitions, next pages):
 - Physical Movement and Description - Information Transactions
 - Hand-Offs and Congestion Points - Data Standards/Transaction Media
 - Physical Security - Information Technologies/Systems
 - Timing - Process Triggers
- ▶ Include main titles, page headings and footers, swim lanes, and other general information on a background layer, or on the “Background” page
- ▶ Provide supplemental, miscellaneous information on a separate layer

Ten dimensions are currently defined and the platform is scalable to allow for additional definitions

- ▶ Physical Movement and Description: Physical movements, for example of conveyances, containers, units of freight, and/or shipments
- ▶ Hand-Offs and Congestion Points: Interface points along supply chains, especially where more than one actor is involved in handing off assets
- ▶ Physical Security: Physical hardware, software, procedures, etc. in place to monitor and/or ensure the security of the assets
- ▶ Timing: Durations and elapsed times for processes, possibly described by averages, statistical modes, magnitude and probability of deviations from the average or mode, and/or best and worst cases
- ▶ Information Transactions: A description of the formal and/or informal exchanges of data, information and messages that take place in support of the planning, measurement of, or operation of supply chains

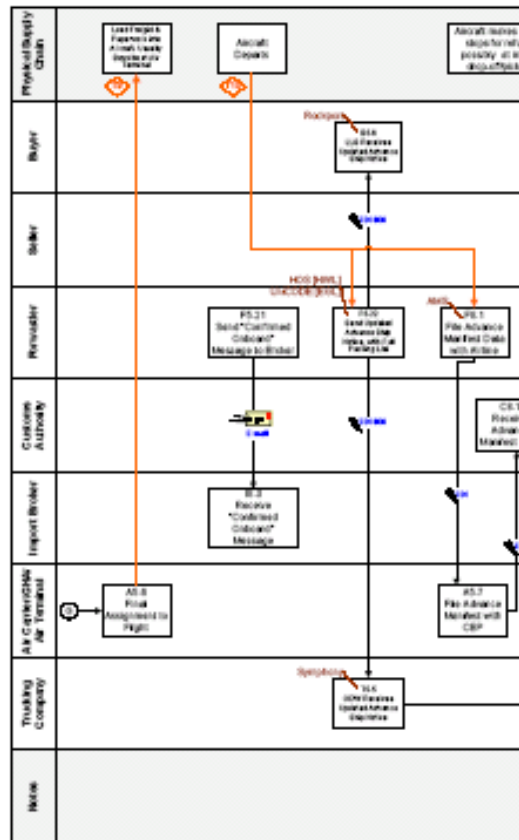
Ten dimensions are currently defined and the platform is scalable to allow for additional definitions (continued)

- ▶ Data Standards/Transaction Media: Use of recognized industry standards in support of the information exchanges
- ▶ Information Technologies/Systems: The technologies and kinds or specific names of systems that are typically or actually used to store, process and communicate the information transactions
- ▶ Process Triggers: A depiction of the information milestones that must take place for a physical activity to take place, or vice versa. For example, if a load must be signed for before a transportation asset can leave a facility, the signature information is a trigger for the vehicle dispatch
- ▶ Regulations and Policies: The regulations and policies that affect the way work for the specific process is performed
- ▶ Resource Management: A depiction of how personnel and equipment resources are managed

Example, Documentation using Multiple Layers

All Information-Related Layers

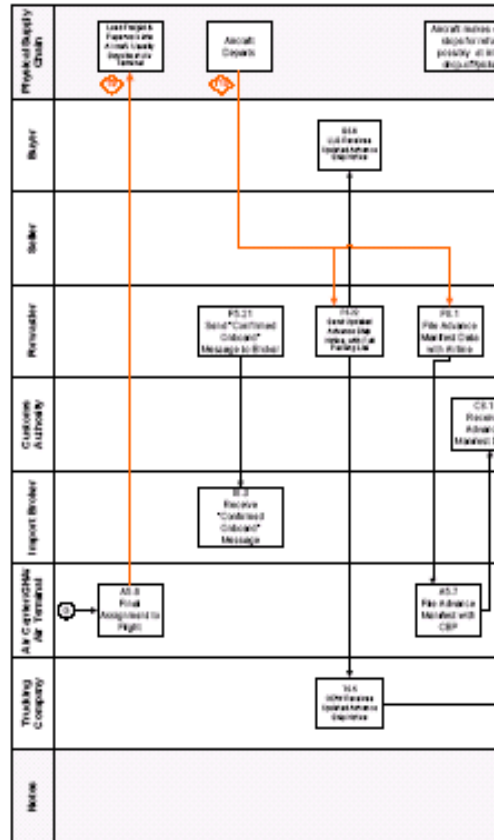
EFM Deployment Test - Information Exchange View



Boat | Allen | Hamilton
Legend
Blue = Means of Information Exchange
Orange = Process Trigger

Information Exchanges & Process Triggers

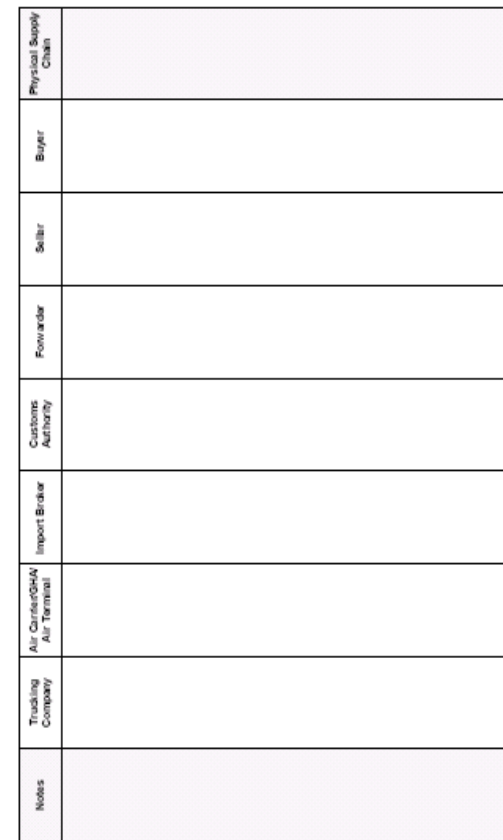
EFM Deployment Test - Information Exchange View



Boat | Allen | Hamilton
Legend
Blue = Means of Information Exchange
Orange = Process Trigger

Titles, Swim Lanes & Page Footer

EFM Deployment Test - Information Exchange View



Boat | Allen | Hamilton
Legend
Blue = Means of Information Exchange
Orange = Process Trigger

Standard 2: Utilize colors to differentiate the text, shapes and connectors used for each supply chain dimension

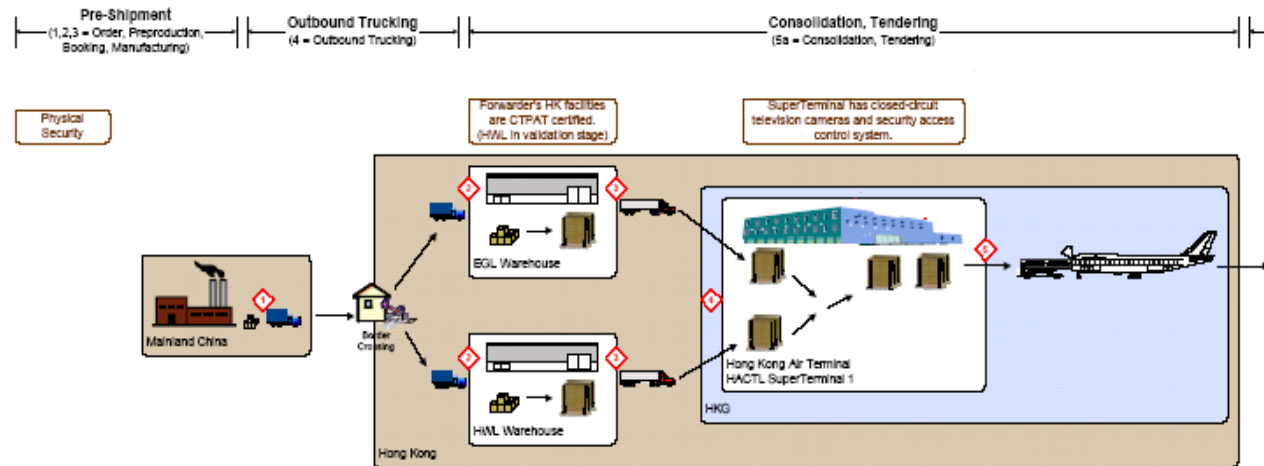
- ▶ Associating a color with a specific dimension enables people to quickly differentiate between the dimensions
- ▶ Use following color-scheme for documentation:

Dimension/Layer	Color
Physical Movement and Description	Black
Hand-Offs and Congestion Points	Red
Physical Security	Brown
Timing	Black
Information Transactions	Blue
Data Standards/Transaction Media	Blue
Information Technologies/Systems	Green
Process Triggers	Orange
Background	Black
Miscellaneous	Black

- ▶ Additional colors may be utilized, in addition to the color scheme, to enhance readability and provide impact and differentiation between activities

Example, Use of Color in Documentation

EFM Deployment Test - Supply Chain View - Hand-Offs, Timing & Congestion, Physical Security Detail



Timing and Congestion

Pre-Shipment	Outbound Trucking	Consolidation, Tendering
Letter of credit is generated many months before shipment. POs for the Express brand, when used, are cut 4-6 weeks prior to desired shipment arrival date. Forwarder is notified of the PO about 4 weeks in advance. Booking is confirmed between manufacturer and forwarder in the ensuing weeks prior to shipment.	For the factories selected, the transit time from factory to the forwarder facility in Hong Kong is 2-4 hours. This assumes no delays at the border into Hong Kong, which is normally the case. Export Customs is normally very expeditious. Longest delays seen (exceptional) are 6 hours.	- From arrival at forwarder's facility in Hong Kong to departure for the air terminal, the dwell time is typically 4-10 hours. - Local truck movement from forwarder's Hong Kong facility to HACTL takes 20-30 minutes. - HACTL has a cut-off time for receipt of freight from the forwarder of 4 hours prior to the flight's scheduled time of departure. In a typical scenario, freight moves from the forwarder to HACTL 11pm, and is staged for takeoff on a morning flight. - From arrival at HACTL to "wheels up", it's typically 4-12 hours, given that the freight is received prior to the cut-off time and there are no congestion delays. - There can be a variety of delays at HKG that cause congestion and delays. Examples of causes are weather problems and capacity problems (overbooking sometimes) on the aircraft. Delays can be up to three days.

Hand-Offs

- Factory loads freight to trucking company. Driver comes to factory, loads freight, and takes possession.
- Trucking company's driver delivers freight to Freight Forwarder's inbound dock.
- Forwarder (EGL, not verified for Hekmann) has contracts with local Hong Kong trucking companies. Freight tendered to them at forwarder's outbound dock.
- HACTL ramp personnel physically load freight and a package of documents (mandatory to include the MAWB) onto aircraft. Air freighter company now in possession of the freight.
- Forwarder's contracted trucking company's driver arrives at Hong Kong air terminal, operated by HACTL. Freight offloaded into terminal, where HACTL now has possession. Workers stage pallets for loading onto aircraft.

Standard 3: Use consistent nomenclature for descriptions, processes, labels and attributes

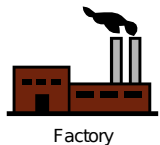
- ▶ Consistency facilitates comparison of and provides for easier reading of the documentation
- ▶ Begin process and task descriptions with a verb, for example:
 - Generate Purchase Order
 - Schedule Shipment Delivery
- ▶ Use capital letters to begin “important” words within process flow diagrams, for example:

Enter Booking
Data

Alert
Forwarder that
Freight is
Ready

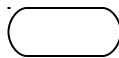
Notify Broker
that Shipment
has Arrived

- ▶ Use consistent units of measure when assigning attributes, for example:
 - Duration (hrs, min, days)
 - Cost (\$, per unit, per time)
 - Frequency (per day, per week)
- ▶ Position labels and descriptors below entities, for example:

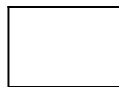


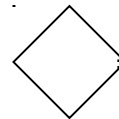
Standard 4: Use standardized shapes and objects within each supply chain dimension or documentation layer

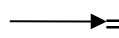
- ▶ Consistent use of shapes and objectives provides for straightforward “reading” of the supply chain, as people can easily recognize aspects of supply chain and its processes by the object that represents them
- ▶ Use the following shapes for standard process documentation:

 = Start or End Point

 = Delay

 = Activity/Process Step

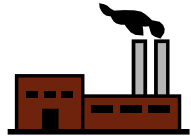
 = Decision Point

 = Movement/Direction of Flow

 = Off-Page Connector

- ▶ Use the custom stencils, shown on the following pages, to select shapes that represent specific supply chain-related entities and activities

Supply Chain Stencil Objects - Buildings and Locations



Factory



Warehouse/DC



Bonded
Warehouse



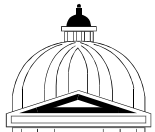
Foreign Trade Zone



Air Terminal



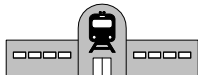
Airport/Out-Bound Flight



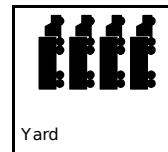
Government



Gas station



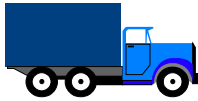
Train station



Yard

Trailer Yard

Supply Chain Stencil Objects - Transportation Modes



Lorry



Tractor Trailer



Truck



Car/Vanpool



Taxi



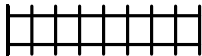
Auto



Bus



Ocean Liner



Train Tracks



Intermodal Rail



Intermodal Rail with Engine

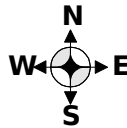
Supply Chain Stencil Objects - Miscellaneous



Boxes/Product



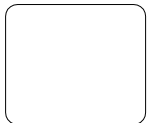
Luggage



Compass



Globe2



Generic Border



Govt.
Inspectors



Broker

Information Flow Stencil Objects

Transaction Media



Information Technologies

System Name

Process Triggers



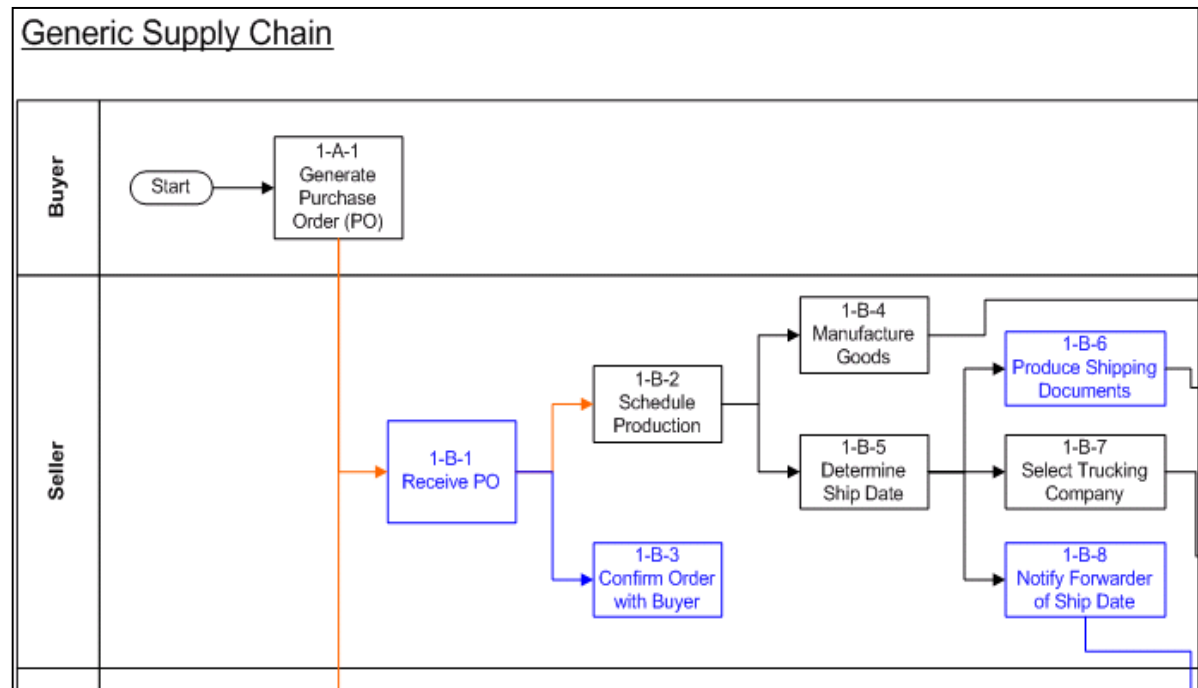
Standard 5: Number shapes within process diagrams for unique identification

- ▶ Uniquely identifying each activity or process step enables referencing that step in other documentation
- ▶ The numbering schema specifies the phase of the supply chain in which the activity occurs and the organization or party that performs the activity
- ▶ Use a number as the first digit of the identifier to indicate the supply chain phase
 - Number the phases 1 through n to include all supply chain phases sequentially (1, 2, 3, ...)
- ▶ Use a letter as the second digit to indicate the organization or party performing the activity
 - Use A through Z sequentially to identify each individual organization or party (A, B, C, ...)
- ▶ Use a number as the third digit to indicate the order in which the steps occur (1, 2, 3, ...)
 - Restart this numbering for each new phase and organization involved
- ▶ Separate each digit with a dash, for example:
 - 1-A-1 = phase 1, party A, process step 1
 - 3-F-2 = phase 3, party F, process step 2

Example 5: Supply chain phase definitions and numbering schema

Number	Supply Chain Phase
1	Pre-Shipment
2	Outbound Trucking
3	Consolidation, Tendering
4	Delivery to US
5	Recovery
6	Inbound Trucking, Delivery

Letter	Organization / Party Involved
A	Buyer
B	Seller
C	Freight Forwarder
D	Customs Authority
E	Import Broker
F	Air Carrier
G	Trucking Company



Standard 6: Use a consistent naming convention for supply chain documentation

- ▶ Supply chain titles should describe the characteristics of the supply chain, such as:
 - Industry
 - Business Functions
 - Transportation Modes
 - Applicable Geographic Regions
- ▶ Provide additional description below the title on the summary page to further define the nature of the supply chain, as illustrated in the example below

Asia to US - Truck-Air-Truck

Description:
Generic representation of the process steps involved with shipping a make-to-order product in the clothing apparel industry from a source in Southeast Asia to a consignee's warehouse or distribution center in the United States.

- ▶ File names should echo the supply chain title for ease of use and to minimize confusion (Example: Drayage - Cross-Town Exchange - Kansas City.vsd)

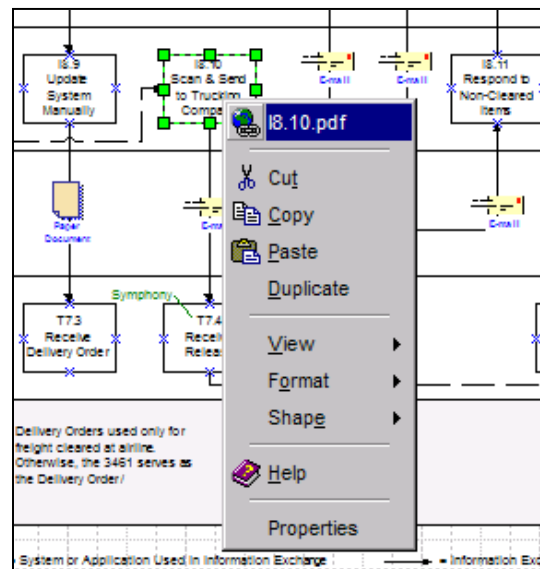
Standard 7: Use custom shape properties to provide additional detail about each process step

- ▶ Custom properties link additional descriptors or attributes to process steps for use in analysis
- ▶ The process shape, , in the supply chain and information flow stencils contains four pre-defined properties
 - SCOR: Defines the SCOR Level 3 process that corresponds to that specific process step with the supply chain
 - Duration: Defines the length of, or time to complete, the process step
 - Resources: Defines the number of people require to complete the process step
 - Cost: Defines the cost associated with performing the process step
- ▶ Additional properties should be added and defined as necessary

Standard 8: Consistently embed detailed information to elaborate on processes or other objects

- ▶ Recognizing the electronic delivery of the platform, objects and other nodes may be double-clicked to bring up additional detail about that particular object. This might be numeric data, documents, or picture files (such as a bitmap of a form used in an information transaction)
- ▶ Icons that do have drill down available via a double-click will be uniquely identified (method of identification to be determined)

For example: Click on object 18.10 to bring up Customs Form 3461



Glossary of Terms

Glossary of Terms

- ▶ Entity: Objects that “move” through or represent stages within the process; such as, materials or equipment
- ▶ Layer: A named category of objects, used to organize relationships within a Visio drawing
- ▶ Object: A shape or entity that represents part of the process or supply chain, located within a stencil in MS Visio
- ▶ Shape: Object that represents an activity or process step
- ▶ Stencil: A collected of objects associated with a particular Visio drawing type or template
- ▶ Swim Lanes: Dividers used to organize and separate process steps by groups, organizations or roles; used to delineate ownership of the processes